

• COLORADO RIVER •
AQUEDUCT NEWS

THE METROPOLITAN WATER DISTRICT

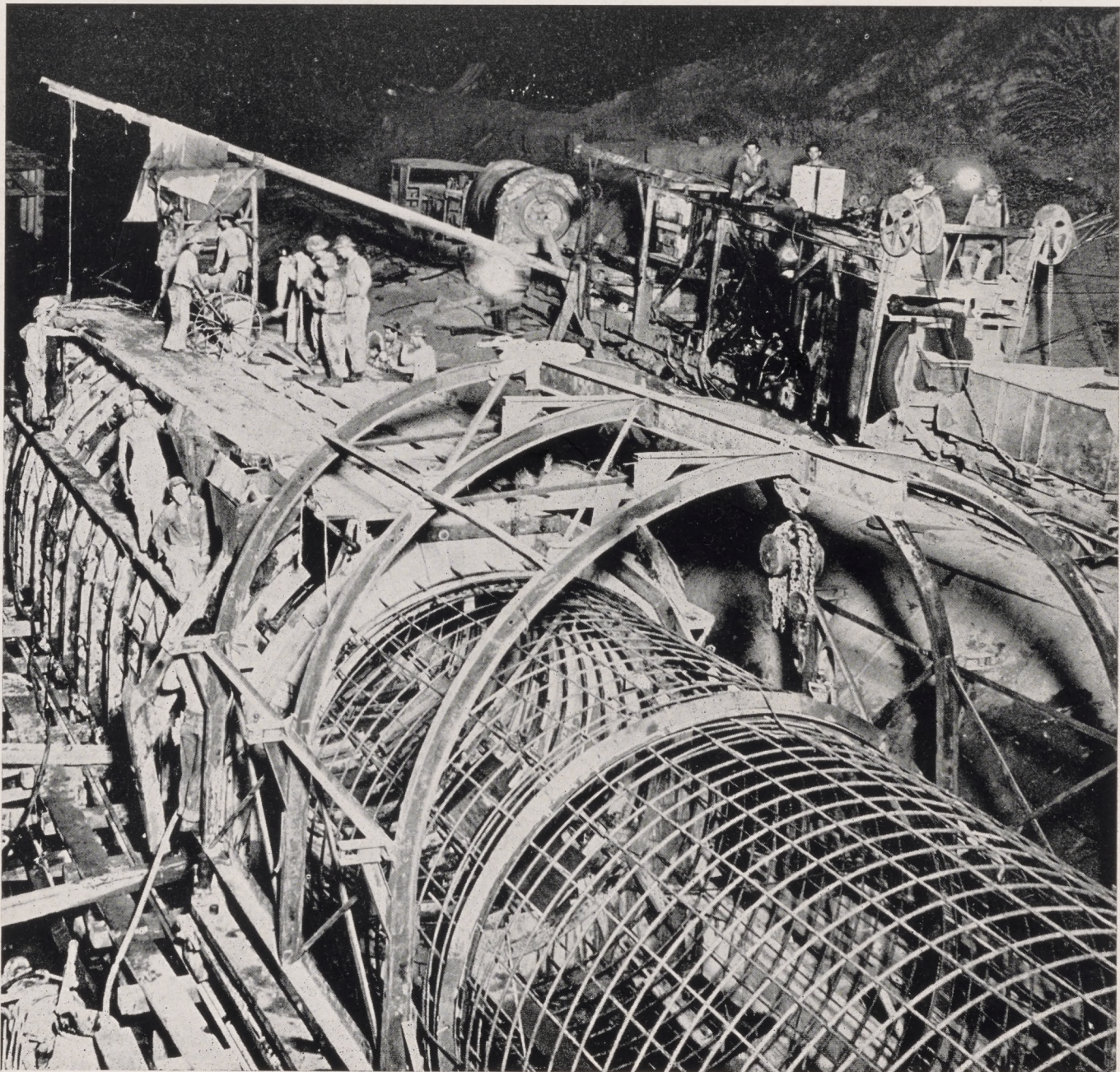


OF SOUTHERN CALIFORNIA

Vol. VI.

JULY 25, 1939

No. 7



Night crew at work placing concrete in the Casa Loma siphon at the west portal of San Jacinto tunnel. This is the last construction work on the main aqueduct.

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 THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

306 WEST THIRD ST.
 LOS ANGELES, CALIFORNIA

*Published monthly in the interest of
 Field and Office Workers on the Colorado
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 of all other citizens of the Metropolitan
 Water District.*

Vol. VI July 25, 1939 No. 7

Seek To Reduce Cost of Boulder Dam Power

By F. E. WEYMOUTH
 General Manager and Chief
 Engineer, M.W.D.

A concerted effort is being made by the purchasers of power from Boulder Dam to secure congressional legislation which will change the basis of charges and reduce the cost of electrical energy from this source.

Before construction of the Dam was started the prospective power users were required to enter into contracts which, in the opinion of the Secretary of the Interior, guaranteed returns sufficient to pay all operating expenses and amortize the cost of the entire project, except the flood control allocation, within 50 years, with interest at 4 per cent. Under the present or original Project Act the states of Arizona and Nevada, each, are to receive in cash 37½ per cent of any earnings in excess of the amount necessary to repay the government's investment. The remainder of the surplus earnings are to be applied to the repayment of the investment for flood control, fixed at \$25,000,000.

Thus the government is receiving 4 per cent interest on money borrowed at less than 3 per cent, and the flood control and irrigation interests are receiving free of cost the benefit of this immense project paid for entirely by power customers.

In order to reduce the burden on Boulder power users an effort is being made to secure the passage of the Boulder Canyon Adjustment Act, which will reduce the interest rate to 3 per cent; defer without interest for 50 years the repayment of the flood control allocation, and establish power rates on the basis of actual cost of operation, main-

(Continued on Page 7)



The "destruction" crew cutting out water pipes and removing other utilities from the Potrero shaft of San Jacinto tunnel. The bucket in which the men are riding is the original one used when excavation of the shaft was started in 1933.

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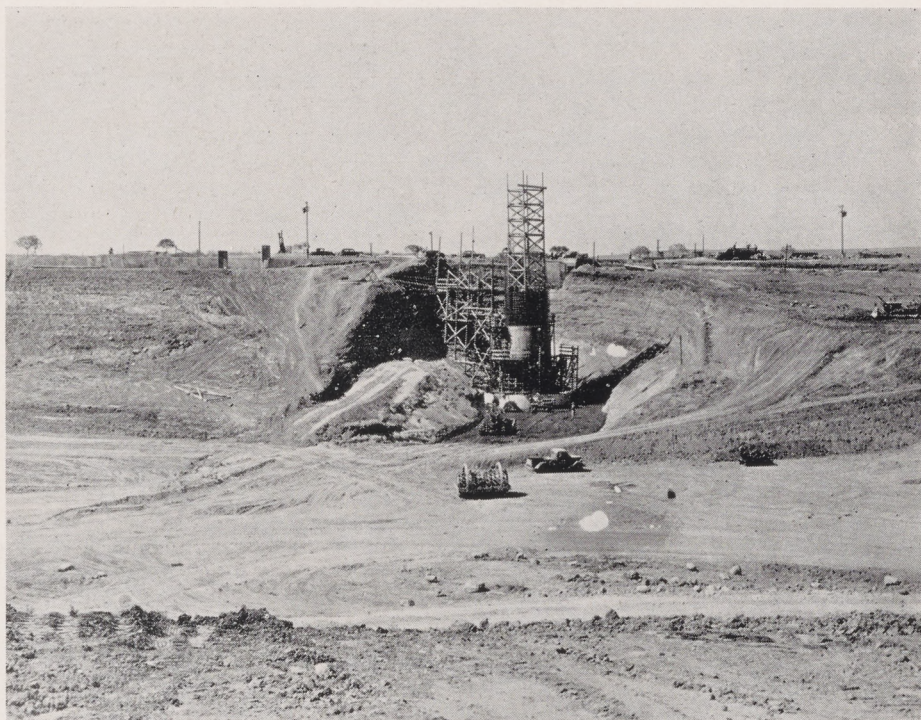
Distribution Work In Southwest Area Nears Completion

Construction progress reports submitted by Distribution Engineer R. B. Diemer indicate that work is rapidly being completed in the building of distribution facilities in the southwestern part of the metropolitan area.

One of the principal features being constructed in this area is the Palos Verdes feeder which will serve Colorado River water to Los Angeles, Compton, Torrance, Long Beach, and the Los Angeles harbor area. The upper end of this feeder, made up of Schedules 21SC, 22SC, and 23SC was completed by the J. F. Shea Company in the spring of this year.

On July 13, the last section of mortar lined steel pipe was placed on Schedule 24SC, being built by the Emsco Derrick and Equipment Company. The total length of the schedule is 35,939 feet. On July 8, Emsco crews began excavation at the outlet of the Palos Verdes reservoir working north on Schedule 25SC and the first pipe was placed in this section of the line on July 24. Approximately 20,000 feet of pipe remain to be placed on this schedule, one part of which was placed in connection with the construction of Schedule 24SC.

The placing of pipe in the Long



Construction of the outlet tower in the Palos Verdes Reservoir on the Distribution System. Compaction of earth fill and blanket at the reservoir is now approximately 80 per cent completed.

Beach lateral, Schedule 26SC, being built by the Western Pipe and Steel Company, was finished on July 7, and this contractor began the placing of pipe for the Torrance lateral (Schedule 27CS) on July 11.

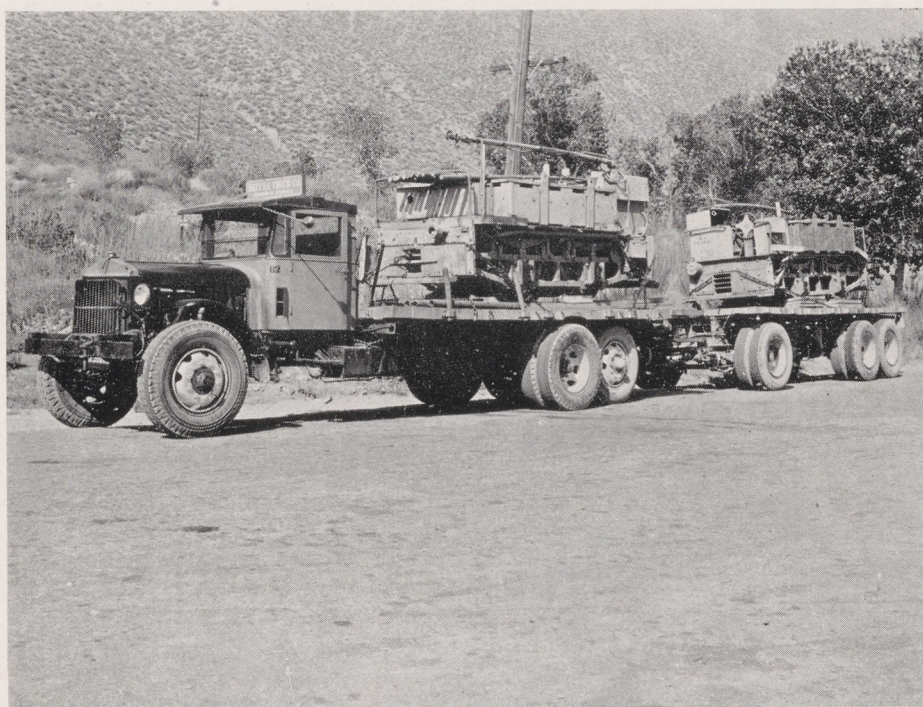
Down at the extreme south end of the cross feeder, crews of the W. E. Hall Company were maintaining a high rate of progress on the construction of the 1000-acre-foot-capacity Palos Verdes Reservoir. By the week ending July 22, the progress reports indicated that approximately 80 per cent of the main embankment and blanket had been placed and compacted.

PRELIMINARY TESTS AT HAYFIELD STARTED JULY 24

Working under the direction of Chief Electrical Engineer J. M. Gaylord, testing crews of the District began preliminary tests on the main pumping units at the Hayfield plant on Monday, July 24.

Pump efficiency tests, using the salt velocity method, have already been run at the Intake, Gene, Iron, and Eagle Mountain plants. The Hayfield plant is the last of the five plants which will lift aqueduct water a total height of 1617 feet. The lift at the Hayfield plant itself is 441.6 feet. The pumps at this plant were built by the Worthington Manufacturing Company.

The Bureau of Reclamation is preparing to take bids on three 40,000 hp. vertical hydraulic turbines to run at 95 r.p.m. and to be installed in the Parker Dam power house. Bids are scheduled to be opened on Aug. 15 in Denver.



Two more old-timers leave the job. Electric locomotives from San Jacinto tunnel being hauled away to be sent north for work in the Shasta Dam tunnels.

Special Equipment

Special type of construction equipment invented and developed during the building of the aqueduct.

By EZRA RIDER

Engineer, Experienced, M.W.D.

Early in the preliminary investigations of the Colorado River Aqueduct project, provision was made in estimating the costs of construction for the use of the most modern plant and equipment. It was assumed that, as on previous large projects, necessity would be the mother of invention, new machinery would be developed to fit the need, and existing equipment would be enlarged and improved to increase both power and capacity. The next step was to lay out for good-sized units the plant and equipment necessary for efficient operations based on time for completion of the project, assumed rates of progress, and most economical final cost of the many features.

For example drill carriages and mucking machines were included in the earliest lists of tunnel-driving equipment in order to permit the drilling of the full face. Both were known to tunnel men but not as equipment that had outstanding advantages over the old methods of drilling from bar or column and mucking by hand.

Drilling.—On this project a radically different drill carriage was developed with the folding wings on the sides and extensible center platform in the front so that when in operation at the face with the wings up, no staging or other set-up was necessary. Since the drills were kept on their mountings, except when repairs were required, heavier and more powerful drills could be used without undue strain on the operators. The combination of carriage and heavy drills, mounted, connected to manifolds and serviced ready to go, enabled tunnel crews, when mucking of the previous round had been completed, to move into a clean heading and begin drilling the new round in about 10 minutes. To drill the full round required from 1½ to 4 hours, dependent upon type of rock, depth of round, and number of holes.

When the Coachella work was started in December, 1932, standard drifter drills were of the hand-feed type, and many of this kind were purchased and used by the District and by contractors. Automatic feed and pneumatic feed drills were introduced and generally adopted with very satisfactory results from the standpoint of both the drill runner and his employer. These new drills maintained a uniform rate of feed

with a minimum of effort on the part of the machineman, and retracted the drill in less time when the full run had been made.

Mucking.—Progress in tunnel driving depends largely upon how quickly the blasted rock can be removed. Where mechanical muckers are used mucking speed is affected not only by the capacity of the mucker itself, assuming a skilled fast operator, but very greatly by the time consumed in pulling away the loaded car and pushing up an empty. A great deal of effort was expended in developing car-passers, from "cherry pickers," set up near the face, which lifted the empty above the track so that the loaded car could pass beneath, to the combination machine, a drill carriage and overhead car-passer with ramps up which empties could be pulled from the rear and lowered to the front, while the loaded car went through below, and the combination drill carriage and conveyor loader, long enough to load out a full train of cars without cessation of mucking. Probably the simplest and most practical of all was the "California switch," a portable double track with switches at both ends which was moved along on the tunnel track as the excavation proceeded, being kept as close to the face as desired.

Various small muckers played a part in opening aqueduct tunnel excavation, but were displaced by the heavy Conway and Bucyrus machines, the latter being installed by two contractors and used in four tunnels only out of the thirty-seven on the main aqueduct and distribution system.

The Bucyrus was a miniature of the well-known shovel used on surface work and was an effective mucker, though somewhat cramped for room in the 18-foot tunnel section.

The original Conway mucker was a light machine invented for mining work in the lead and zinc mines of the Tri-State district in the Mississippi Valley. The first Conways on the aqueduct came from the Edison Big Creek job and were equipped with air motors procured from the Hetch Hetchy Coast Range tunnel because electric power was not yet available. They were 30's, and were dwarfs compared with the 50's and 60's which soon followed. At San Jacinto some of the Conways were equipped with 75 h.p. motors, other parts of the muckers being strengthened accordingly.

The speed of the muckers in well broken material made possible the record advances in a number of tunnel headings. Frequently 5-cubic-yard cars were loaded in 4 to 6 minutes, including switching time.

Haulage.—In tunnel haulage a somewhat radical departure from customary practice was made in equipping a number of tunnels with storage battery locomotives to the entire exclusion of the trolley type. Under severe service conditions, with long hauls, they proved to be safe, reliable, and economical in operation during the entire construction period. In other tunnels the combination of storage battery and trolley locomotives proved distinctly advantageous.

New cars incorporated several improvements, particularly the use of roller bearings, permitting the hauling of longer trains and larger loads.

Concrete lining.—In tunnel lining operations, improvements were made in steel forms, and in travellers for moving the forms in short sections where the continuous placing method was used. Continuous placing was somewhat of an innovation in itself. Pneumatic equipment, so called because compressed air was used in moving concrete from the gun through the discharge line into the forms, was extensively employed but more than half the concrete lining on the aqueduct was placed by a new development of the concrete pump. With continuous supply of aggregate to the mixer on the Pumpcrete machine, provided by specially designed batch cars, rate of placing concrete in the forms was speeded up remarkably. Machines rated at 480 cubic yards per 24 hours pumped an average of 640 yards over periods as long as nine months. Larger capacity machines of the same type placed a daily average of 865 cubic yards during one entire month. The one-day maximum for a large Pumpcrete was 1,387 cubic yards of concrete.

Surface equipment.—On the surface schedules standard excavating equipment was in general use for all rough excavation. This equipment consisted of gasoline, diesel and electric-powered draglines, gas and diesel shovels, tractors with bulldozer attachments, trucks and carryalls. The final excavation to grade and compacting of subgrade for the invert of cut-and-cover conduit and siphons was accomplished with scrapers and rollers and by hand methods. For rapid delivery of concrete from mixers on the bank to a hopper at the center of forms in the trench, extensive and successful use was made of belt conveyors. However, when it came to the final trimming of the typical canal section in earth and placing the concrete lining therein, important and radically different equipment was developed on the job, namely, the canal trimmer and the canal paver.

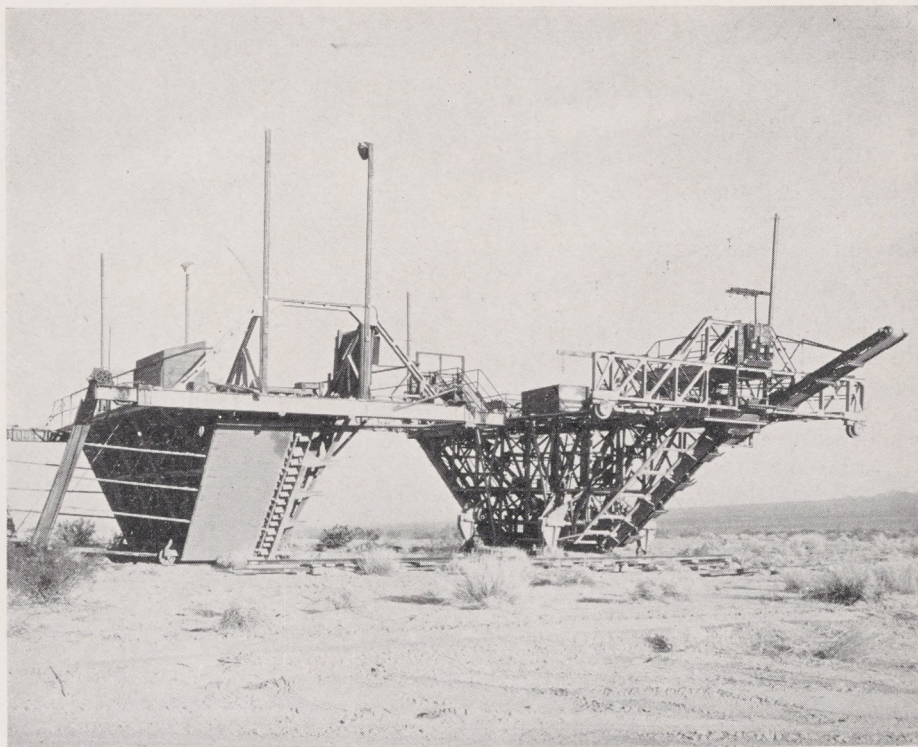
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Special Equipment

(Continued from Page 4)

In the winter of 1934-35, when construction of the desert schedules of the surface work was begun, contractors generally followed the customary method of trimming the canal sides and bottom largely by hand, and placing concrete in the invert and sides separately, much after the manner of building concrete roads with pavers. Canal construction carried on in this manner proved to be not only slow but altogether too costly. There was one exception to this starting procedure. On Schedule 8 Clyde Wood, one of the contractors, conceived the idea of trimming the canal section by machine and laying the concrete lining with a modified slip form. Considering that in each mile of canal there was approximately 8 acres of surface to be trimmed and finished to close lines and grade, a good deal of money could profitably be spent on equipment to do this type of work rapidly and economically. The Wood trimmer was successful and during the summer of 1935 canal trimmers or subgraders were adopted on all canal schedules but one.

Essentially the trimmer was a rigid framework supporting the cutting and shaping mechanism in the trench. It was made up of end trusses set parallel to the canal center line fitted with wheels resting on track on the canal bank. To



A canal paver (left) and canal trimmer (right), two of the machines which were specially developed on the aqueduct. Picture shows equipment being moved across desert from one canal schedule to another.

the end trusses were attached trusses extending down into and across the canal section to hold the framework and trimming mechanism rigidly in alignment and transfer the entire weight to the

track. Methods of completing the removal of material left by the draglines in making the rough excavation varied but included bucket elevators, sometimes with teeth on the cutting edge, and cross conveyors to dispose of material on the canal banks. The final shaping was done by a blade set in the framework to the exact dimension of the trench, the material pushed ahead of the blade being picked up by the bucket elevators.

Weighing approximately 50 tons the trimmers were moved by means of tractors in the trench and under normal conditions completed to exact line and grade from 60 to 75 feet of canal per hour.

The framework of the monolithic paver was somewhat similar to that of the trimmer, which it followed on the same track. The transverse trusses carried a steel plate or slip form whose shape conformed to the inside finished cross section of the canal and whose edges were rolled slightly to avoid damage in passing over finished surfaces. The bottom plates were square with the canal, but the side plates were set on a slight angle to the rear to give support from below to the freshly deposited concrete at the top of the slope. A continuous hopper extended across in front of the slip form into which concrete was dumped from a shuttle car on top of



One of the types of steel forms for conduit construction which were developed on the aqueduct.

(Continued on Page 6)

MONTHLY REPORT REVIEWS ACTIVITIES ALONG THE AQUEDUCT LINE

(EDITOR'S NOTE: The following is a brief summary of some of the activities of the District as set forth in the monthly report of General Manager F. E. Weymouth, filed with the Board of Directors in July, covering work done in June.)

Miscellaneous Activities Division

Seventy-five labor employment applicants were cleared for work on the aqueduct of whom one was made available for force account work and 74 were made available for aqueduct contractors.

During the month of June there was set under way the release of the District's motion picture "The Thirteen Golden Cities," to motion picture theaters in the cities of the District. Prints of the film have been made available to theaters throughout the metropolitan area and are to be exhibited during the next several months.

Main Aqueduct

San Jacinto tunnel—The work remaining consists of low-pressure grouting in 9,862 feet of tunnel; high-pressure grouting in sections where this operation is required; and clean-up including the removal of utilities, track, and bridge.

Casa Loma siphon—Excavation of trench in the San Jacinto tunnel west portal approach cut and placing of siphon barrel are proceeding from the completed portion of Casa Loma siphon toward the tunnel portal. Owing to the wet subgrade, a gravel blanket is being laid and rolled and a 6-inch concrete slab placed upon it. The reinforcement steel is then set on the slab, forms moved into position, and concrete placed in the barrel in short sections. Excavation is approximately 65 per cent completed, and 135 feet out of 752 feet of barrel have been placed. The daily working force on both San Jacinto tunnel and Casa Loma siphon averaged 364 men in June, compared with 430 in May.

Maintenance—The water level in Lake Havasu, as it was officially named on June 1, has been maintained slightly above Elevation 440. Many inquiries are being received by the U. S. Bureau of Reclamation relative to future use of the lake for recreational purposes.

All bulkheads, check dams, and debris were removed from the main aqueduct between the Casa Loma siphon and the Valverde tunnel. The entire main aqueduct is now ready for water except for the San Jacinto tunnel and east end of Casa Loma siphon.

Aqueduct patrol roads on construc-

tion schedules 10, 11, 12, 13, 14, 15, and 16 were worked over and put in good condition. Considerable work was also done on the canal berms of schedules 3 and 9.

Salvage Division—Based on appraised valuations, the amount placed on salvage division books during June amounted to \$187,451, making a total to date of \$1,482,973. Total disbursements for the month amounted to \$66,903, making a grand total of disbursements to date of \$630,662.

Civil Engineering Division

Specifications—Bids were opened during the month on Specifications No. 304 for softening plant equipment, and No. 308 for cement required to complete the San Jacinto tunnel and Casa Loma siphon. Good progress was made on the draft of the specifications for the construction of the softening plant.

Design—The architectural and structural drawings of the administration building at the water softening plant were completed to the stage that they were transmitted to the Los Angeles County Building and Safety Department for review. Good progress was made on the mechanical and electrical designs relating to all units of the softening plant.

Drawings for the electrical wiring at the upper feeder headworks at Cajalco were completed.

Materials—Deliveries of District furnished materials during the month included 37,000 barrels of cement, 84 tons of reinforcement steel mesh, 98 tons of coal-tar enamel, and 1,400 gallons of coal-tar primer.

Distribution Division

One survey party was employed throughout the month making alignment and profile surveys of the Santa Monica feeder line, and revisions of the Glendale-Burbank feeder line. Office studies were made in connection with the location of the Orange County cross feeder, and of alternative locations for the Santa Monica feeder.

Work continued throughout the month on the Palos Verdes feeder south of 98th Street, on the Long Beach and Torrance laterals, and on the Palos Verdes reservoir.

Electrical Engineering Division

The work of installing minor equipment and making miscellaneous revisions was continued at all five pumping plants. Efficiency tests of the main pumping units were completed at the Iron Mountain and Eagle Mountain pumping plants.

Purchasing Division

A total of 702 purchase orders was issued during the month, totaling approximately \$68,700. Carload forwardings totaled 54.

Accounting and Costkeeping

The total cost of the work accomplished to June 30, 1939, was \$179,221,241.

In summarizing the manner in which the number 13 has played a part on the aqueduct (issue of June 25) the office boy neglected to include the fact that Assistant Chief Engineer Julian Hinds is the proud grandpappy of a granddaughter who arrived on June 13, 1939. The young lady, who was named Sarah Louise Waldron, is the daughter of Mr. and Mrs. John H. Waldron, Jr. Mrs. Waldron is the daughter of Mr. Hinds.

Special Equipment

(Continued from Page 5)

the machine in such a way as to maintain a uniform head of fresh concrete as the paver advanced. The space between the subgrade and slip form was filled with concrete forced in by pressure of the supply in the hopper above, assisted generally by vibration of the concrete.

The monolithic lining was placed at a rate often exceeding one foot per minute, the forward travel being effected and controlled by two independent winches mounted on the front end with cable attached to the track ahead.

Many special machines were used on the distributing system but space permits mention of only a few. In fabricating the heavy sections of precast concrete pipe the mandrel used at Rochester in making up the reinforcement cages was developed by the contractor to wind continuous rod spirally upon the longitudinal reinforcement. In the construction of the Palos Verdes feeder the trench excavators were built with cutting teeth and buckets arranged to dig a cradle into which, after a minimum of hand work, the gunited pipe could be laid for a snug fit. The spun mortar lining of this pipe was placed by a special machine which rotated the pipe at a speed of 900 r.p.m.

High Pressure Grouting Finished In San Jacinto

Working toward the day in the near future when Colorado River will flow through the San Jacinto tunnel, construction crews are making steady progress on grouting operations and general clean-up in the 13-mile bore.

Progress reports indicate that all high pressure grouting in the tunnel was completed on July 11, and by July 22 approximately 70 per cent of the contemplated low pressure grouting work had been completed.

Two different crews are engaged in the general clean-up work, one crew in the Cabazon section and the other in the Potrero portion of the tunnel. One of the principal jobs in this clean-up work is the removal of the bridge which supported the railroad tracks during the construction period. On July 22, approximately 50 per cent of this bridge had been removed. Work is also under way on the construction of the bulkhead to close off the Lawrence adit.

Good progress is also being made at the West Portal of the tunnel where another crew is completing the last section of the Casa Loma siphon. On July 22, 95 per cent of the excavation had been completed and 60 per cent of the concrete had been placed in the siphon



Erecting steel forms in San Jacinto tunnel to close off the entrance to Lawrence adit.

barrel. The section being built has a total length of 752 feet of which 390 feet is now finished.

On the eastern flank of the mountain, the Cabazon headframe has been dismantled and track removed from Cabazon adit.

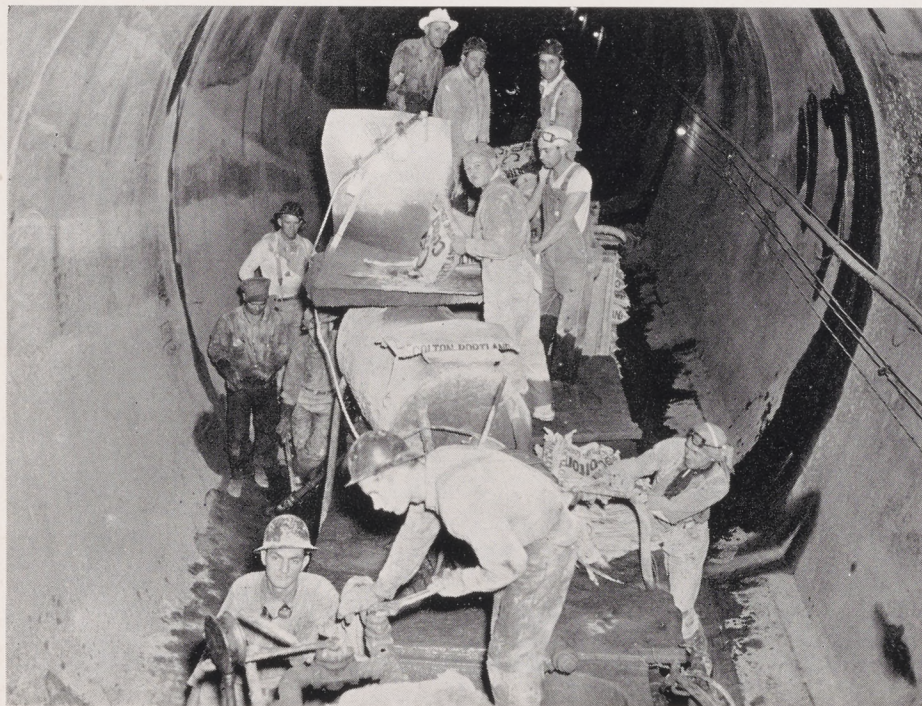
Seek To Reduce Boulder Power Cost

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tenance, and amortization of the remaining investment, plus fixed annual payments of \$300,000 to each of the states of Arizona and Nevada, and \$500,000 into a fund to be used for the development of the Colorado River Basin.

Under this Act the cost of falling water for the production of firm energy would be reduced from the present figure of 1.63 mills to about 1.1 mills per kilowatthour. It is estimated that the new legislation would save the District at least \$10,000,000 during the 50-year period of its contract. The periodical readjustment of power rates would be greatly simplified. The total savings to all power contractors would amount to more than 30 million dollars.

The negotiations leading up to this proposed Act have been carried on over a period of several years, and it is gratifying that the representatives of the Seven States of the Colorado River Basin and of the principal power contractors, last April, reached a complete accord on the terms of the proposed adjustment. The Bill, H.R. 6629, now before the Committee on Irrigation and Reclamation of the House of Representatives was introduced by Representative Scrugham of Nevada.



Grouting crew at work in San Jacinto tunnel between Cabazon shaft and Lawrence adit. All high pressure grouting in the tunnel has now been completed.

OPERATION

**The Colorado River Aqueduct As
An Operating Utility**
By **JULIAN HINDS**

Assistant Chief Engineer, M.W.D.

This paper brings to a close the series of articles which have been appearing in the "News" over the past fifteen months, describing the conception, planning, and building of the Colorado River Aqueduct, with its related storage and distribution facilities. It is fitting that the ending of this series should coincide almost exactly with the completion of the final construction task on the main aqueduct, making it ready for the actual transportation of water from the Colorado River to the coastal plain of Southern California.

The big pumps have already been tuned up and tested and Colorado River water has flowed all the way to the San Gorgonio wasteway at the east portal of the San Jacinto tunnel. Soon this wasteway will be closed and a steady stream of Colorado River water will begin pouring into Cajalco Reservoir, building up a reserve that will forever stand as a sentinel to guard Southern California against the ravages of drought.

The ultimate capacity of the aqueduct is 1,500 c.f.s. (annual average), or about one billion gallons per day. Such a flow will double the present water supply of Southern California. Obviously, this entire flow will not be needed immediately, hence the aqueduct will be brought into use gradually.

Each pumping plant will eventually contain nine pumps, each with a capacity of 200 c.f.s. or 130 million gallons per day. Three pumps have been installed in each plant at the present time and others can be added when needed. These pumps will be operated as required to keep an ample reserve in Cajalco Reservoir.

The functioning of the system will be somewhat as follows:

A water dispatcher in Los Angeles will keep the chief operator, who will be located at the Gene pumping plant, informed as to the volume of water in Cajalco and of estimated future withdrawals. The chief operator will lay his plans accordingly. Before starting the pumps, he must make sure that after allowing for other users below Parker Dam, the water to be pumped is available in the river. If necessary, an order for release of flow will be made on Boulder. Storage in Lake Havasu will afford considerable leeway in the adjust-

ment of flow, making precise, momentary control unnecessary. Following the same starting procedure that has been carefully worked out during the initial tests at the five pumping plants, the Intake plant will be put into operation. Water will be drawn from Lake Havasu and lifted through the delivery line and the Colorado River tunnel into the Gene Reservoir.

Unless the water level in Gene Reservoir has been drawn down below normal for some reason, the Gene and Intake plants may be put into operation at the same time. Because of the storage space available in Gene Reservoir, exact synchronization of the two plants is not essential but they will generally be operated in step.

The flow from the Gene plant climbs the mountain in the 10-foot diameter pipe behind the pump house and flows through 2.4 miles of pipe line and tunnel into the Copper Basin Reservoir.

It will require about 17 hours for the flow to reach Iron Mountain, the next pumping plant 65 miles along the aqueduct from the Copper Basin outlet.

In traversing this long distance, the flow "thins out," so that the first water arrives as a mere trickle which must be accumulated in a small basin provided for that purpose until the flow becomes sufficient to sustain a pumping unit in operation. When this condition is reached, a pump must be started promptly to prevent a wastage of water, as the storage space is limited. Other units are started, one after another, until the water being pumped at this plant equals the release from Copper Basin Reservoir.

In about 11 hours after the first Iron Mountain pumping is started, the vanguard of the flow will arrive at the Eagle Mountain pumping plant after having traversed 41 miles of tunnel, canal, siphon, and covered conduit.

In another 4 hours the flow will have traversed an additional 16 miles of aqueduct, arriving at Hayfield where the final pump lift is located. Here it may be discharged into the Hayfield Reservoir or pumped directly from the canal. The Hayfield Reservoir, when full, is capable of supplying the full aqueduct flow for many weeks and constitutes an important equalizing basin and a valuable protection against an interruption in flow. It makes it possible to keep the western end of the aqueduct in operation should it be necessary to close down the eastern end for maintenance or repairs, thus minimizing the demand for emergency draft on reservoirs within the coastal area.

Water from the Hayfield pumps will

require about 24 hours to traverse the remaining 116 miles of main aqueduct and reach the Cajalco Reservoir where it will be accumulated or drawn out as required to meet the needs of the District cities.

Cajalco Reservoir, when full, will contain 100,000 ac. ft., or 32 billion gallons, of water—enough to supply the present needs of all the metropolitan areas of Southern California for a month without operating the aqueduct pumps, should all other sources of supply suddenly and completely fail. Such sudden and complete failure is of course impossible and any likely partial failure due to drought or other cause could be taken care of for many months from Cajalco alone. Adding the reserve storage which the District will maintain in Morris Reservoir (12 billion gallons), and assuming that the aqueduct pumps will be kept going, the menace of drought as far as the 13 District cities are concerned, will be forever banished.

Water will be withdrawn through a tunnel leading around the west end of the long earthen dike which forms the north rim of the Cajalco Reservoir. For safety, the flow will be controlled by a dual set of valves, one in a concrete tower located in the northwest corner of the lake; and one at the outlet end of the tunnel. The latter will discharge into a stilling basin, visible from the road leading to the reservoir, from which the flow will enter a long pipe line leading across the Santa Ana valley and along the foothills to Eagle Rock canyon at the eastern edge of the City of Glendale. From this huge pipe line, through which a loaded truck might be driven, branches lead to District cities. These branches will be connected to existing distribution systems so that the water from Cajalco may flow into the faucets of every home in the 13 cities of the District.

The water stored in Cajalco will be good water, safe and usable for every human need. However, in its long journey from the snow-capped peaks of Colorado and Wyoming, it dissolves portions of the limestone and other rock materials over which it flows. These substances are perfectly harmless but impart to the water the quality of hardness. To correct this condition, a water softening plant is being provided on the main distribution feeder line. This plant, located near San Dimas, will both soften and filter all water used for domestic and industrial purposes. Thus Colorado River water when it reaches the District cities will be soft and sparkling clear—the best as well as the most abundant water in Southern California.

District Picture Now Being Shown In Southland Theaters

Following a week's run at the Paramount Theater in downtown Los Angeles (week of July 4) at which it was so well received that the theater management requested a return engagement, the District's motion picture, "The Thirteen Golden Cities," has been made available to motion picture houses throughout the metropolitan area and particularly in the cities of the M.W.D.

In addition to the Paramount, the "Cities" was also shown at a number of other downtown Los Angeles theaters including the Million Dollar, the Newsreel, and the Uptown.

By the week ending July 22, approximately 60 theaters had requested bookings of the sound picture which tells the dramatic story of the building of the Colorado River Aqueduct. The picture was scheduled to be shown in most of the District cities during the latter part of the month of July, and additional requests are being received each day by the District for the picture during August and September.

Following is a partial list of the theaters which will show "The Thirteen Golden Cities" in the early part of August:



A "behind the scenes" picture taken during the filming of the prologue of "The Thirteen Golden Cities", M.W.D. picture now being shown in Southern California theaters.

Burbank; San - Val - Drive - In, 2720 Winona Blvd., Aug. 1-3.

Los Angeles; Ambassador, Ambassa-

dor Hotel, Aug. 8-9; Brooklyn, 2524 Brooklyn Ave., Aug. 8-9; Casino, 1605 E. Vernon, Aug. 10-12; Dixie, 6520 So. Normandie Ave., Aug. 4-5; Elite, 9036 Wilshire Blvd., Aug. 4-7; Franklin, 550 No. Figueroa St., Aug. 16-17; Glassell, 3526 Eagle Rock Blvd., Aug. 23-24; Granada, 1044 Temple St., Aug. 2-3; Largo, 1827 E. 103 St., Aug. 9-10; Lido, 8507 Pico Blvd., Aug. 13-16.

Pasadena; Colorado, Colorado Blvd., Aug. 2-6; Park, 1375 N. Fair Oaks Blvd., Aug. 9-12.

Santa Monica; El Miro, 1443 E. 3rd St., Aug. 4-8.

If "The Thirteen Golden Cities" has not already been booked at your favorite community motion picture house, the manager of your local theater may secure the picture by contacting the District at its Los Angeles headquarters. The picture, which is a standard 35mm. sound film requiring approximately 24 minutes to exhibit, is now being made available to commercial theaters without charge.

In addition to handling bookings at commercial theaters, the District is continuing to show the picture with its own portable equipment at various service and civic organizations within the metropolitan area. It is estimated that more than 200,000 Southern California people will have seen "The Thirteen Golden Cities" by the middle of August.



Vernon French, CBS engineer, establishes his control booth in the back of a District station wagon during a recent aqueduct broadcast. The next "on the spot" program from the job will be on August 7, see note page 11.

Group Insurance To Be Made Available Without Physical Examination During August

Doug Fagg, newly elected president of the Metropolitan Water District Employees Association, has announced that arrangements have been completed with The John Hancock Mutual Life Insurance Company whereby employees under 50 years of age may be admitted to the group insurance plan during the month of August without being required to take a physical examination.

Since January 1, 1931, the Employees Association has been carrying a Group Life and Permanent and Total Disability plan of Insurance for the benefit of District employees. The plan, which is carried with The John Hancock Company, has proved very satisfactory and during past years a large number of employees have taken advantage of this inexpensive type of insurance.

During the time that the Association has carried the plan a total of fifteen death claims have been paid and two claims have been paid for permanent and total disability. Records of the Association show that in all cases of death claims, the claims have been paid without question and within a period of a few days after the death of the insured.

Unfortunately, there have been a number of cases of death and permanent and total disability of District employees who were not members of the Group Insurance plan. Due to the employment turnover during the past few years, and because of the fact that there has been no concerted effort on the part of the Employees Association to acquaint new employees with the benefits of the Group Life plan, the officers of the Association believe that there are a number of present employees, not now insured, who may be interested in obtaining policies.

In order to make the insurance readily available to employees who have been on the payroll for more than ninety days, the Employees Association has secured permission from The John Hancock Company to waive medical examinations during the month of August to applicants under the age of 50.

Under the provisions of the Group Life plan, a medical examination is automatically waived for those who have been employed by the District for less than ninety days.

The standard policy issued under the Group Life plan is for \$3,500 which will be paid for death due to any cause, or for permanent and total disability. The cost of this insurance is \$3.43 per

month which is handled by a pay roll deduction, thereby making it unnecessary for the employee to make payments directly to the insurance company. Employees may cancel their insurance at any time by giving written notification to their timekeeper.

The insurance is underwritten by one of the largest and strongest life insurance companies in the United States—The John Hancock Mutual Life Insurance Company of Boston, Mass. It is one of the cheapest types of insurance that can now be obtained, and it is said to be the only type of term insurance that provides for permanent and total disability.

Application cards are being sent to all camps and offices, and the application for insurance may be made through timekeepers or by contacting George H. Swanman in the Accounting Division at the District's Los Angeles headquarters.

Following are some of the most important features of the Metropolitan Water District Employees Association Group Life Insurance Plan:

Schedule of Insurance

All surface workers are eligible for the \$3,500 policy which costs \$3.43 per month. This monthly cost is reducible by means of a cash dividend at the end of each policy year. The amount of the dividend depends upon the amount of the loss ratio suffered by the group during the year.

No Medical Examination During August

All surface employees, under the age of fifty, actively at work are eligible for this insurance without physical examination, providing they make application during the month of August. Applicants more than 50 years of age may be insured by furnishing evidence of their insurability. All such requirements are waived for applicants who have been employed by the M.W.D. during the preceding ninety days.

Certificate of Insurance

Each employee insured will receive a certificate explaining insurance benefits. This insurance in no way affects the benefits you are entitled to under the Workmen's Compensation Act or any other insurance you may carry.

Beneficiary

You have the right to name anyone

you wish as beneficiary. You may name a new beneficiary any time by filing a written request, on forms furnished by The John Hancock Mutual Life Insurance Company, accompanied by the certificate of insurance for proper endorsement.

Death Benefits

Group insurance provides for the payment of the amount of your policy (\$3,500) in case of death from *any cause whatsoever*. This means that you are fully protected while on vacation, week-end trip, or leave of absence.

Permanent Total Disability Benefit

If an insured employee becomes wholly disabled by bodily injuries or disease, before his sixtieth birthday, and will be permanently, continuously and wholly prevented thereby for life from engaging in any occupation or employment for wage or profit, the amount of his life insurance will be paid to him in installments.

If the employee dies before receiving all such installments, the remainder of the installments will be paid to his beneficiary.

This Permanent Total Disability benefit is entirely in addition to any benefits provided by the Compensation Law of the State of California.

Termination of Insurance

The insurance under this plan will cease upon termination of employment.

Conversion of Insurance

In case of termination of employment for any reason whatsoever, the insured is entitled to have issued to him by The John Hancock Mutual Life Insurance Company without medical examination, a policy of life insurance in any one of the forms customarily issued by that Company, except Term Insurance, in an amount equal to the amount of his Life Insurance under this plan (\$3,500) provided an application is made to the Insurance Company within thirty-one days after termination of employment.

As noted above, application cards are being sent to all camps and offices. The physical waiver for those employed more than ninety days is good only for the month of August. Applications must be made through your timekeeper, or to George H. Swanman in the Los Angeles Accounting Office of the M.W.D. Applications will not be received directly by the Insurance Company. Your premium payments will be handled as a pay roll deduction, and it will not be necessary for you to make payments directly to the Insurance Company.

NEWS FROM FIELD AND OFFICE



Neal Smith, M.W.D. engineer and old-timer on the aqueduct, who leaves the District on August 1 to become City Manager of Ontario, Calif. Neal has been on the job since 1928.

Neal D. Smith, one of the oldest (in years of service) old-timers on the job, is to leave the District on August 1 when he will assume the position of City Manager of the City of Ontario, California. Neal, who is well known to main-aqueducters and to Banning residents, has been on the job since April 23, 1928, when he was employed by the City of Los Angeles to work in the Beaumont field headquarters on the preliminary surveys. He has been continuously employed on the aqueduct since that time, and since January 1, 1938, he has been stationed at Division 3 in connection with the building of the Eagle Mountain and Hayfield pumping plants. Neal, who was selected from a large number of applicants for the city managership of Ontario, was born in Reedley, California, in 1902, and graduated from California Institute of Technology in 1925.

* * *

Sponsored by the Columbia Broadcasting System, two more "on the spot" broadcasts will originate on the aqueduct on the evenings of August 7 and August 21. The first broadcast will come from the Coxcomb tunnel and the second from the Hayfield pumping plant. If the first program works out as planned it should be of extreme interest both to the listening audience and to those participating in the broadcast. A boat is to

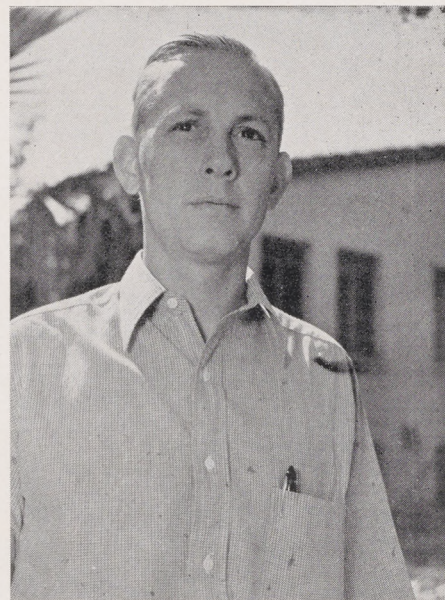
Aqueduct Temperatures June 15 to July 15, 1939

| | Max. | Min. |
|--------------|------|------|
| Div. 1 | 121° | 64° |
| Div. 2 | 116° | 62° |
| Div. 3 | 117° | 63° |
| Div. 5 | 110° | 51° |

be lowered into the open canal at the east portal of the Coxcomb tunnel and then floated through the three mile tunnel to the open canal at the west portal. Riding in the boat will be a CBS announcer who will describe the changing scene as the floating studio makes its way from the open desert, through a mountain, and back to open desert again. The broadcast should be interesting from a technical standpoint since it will be the first attempt that has ever been made to broadcast from a boat in the heart of a mountain. Inasmuch as the canals and tunnel will be carrying 600 cubic feet of water per second, the ride will also provide a certain amount of speculative interest for CBS technicians and one or two M.W.D. employees, all of whom will be trusting that the tunnel profile is



This picture was taken to prove that Supt. Ed Noon, of the Casa Loma siphon, is not wearing a sunbonnet these days. Due to the fact that he's spent most of the last six years underground in the Coachella and San Jacinto tunnels, a vile rumor was set under way to the effect that Ed was hove to under a big blue bonnet in order to preserve his peaches and cream complexion.



This handsome, firm-jawed young man, whose steel blue eyes seem to be piercing distant horizons, is Garland Gray, who started his career on the aqueduct as a chainman in 1934, and now works in the Banning Office. It's no use gals—he's already married.

accurate and that there will be no blind dips when they get inside the hole. This broadcast, and the one on August 25, will be on the air at 10:15 P.M. The programs are released in Southern California over station KNX and are carried on the Pacific Coast by stations of the Columbia Broadcasting System.

* * *

Douglas Fagg, of the Electrical-Mechanical Division, and Nadene Harvey of the Treasurer's Office were recently elected President and Secretary, respectively, of The Metropolitan Water District Employees Association. Doug Fagg has been with the District since April, 1933, when he was first employed in the Indio office. He later worked at the Pushawalla and Berdoo camps on the Coachella Division, and in the Los Angeles Accounting office. Miss Harvey was employed in February, 1933, and started work in the Accounting Division.

* * *

Just in time to celebrate the election of his pappy as President of the Employees Association was Douglas Kirby Fagg, who was born on June 27.

* * *

General Foreman T. H. "Robbie" Robertson has been transferred from the Banning Shops to the Hayfield pumping plant.

Awards Made For Softening Plant Equipment

Totaling approximately \$138,000, awards were made to nine different manufacturers for equipment for the District's water softening plant by the Board of Directors at its regular meeting on Friday, July 14.

The various valves, meters, pumps, and other types of equipment are to be furnished in accordance with Specifications No. 304 on which bids were opened June 22.

Following is a list of the equipment, manufacturers, and prices on which the awards were made (all prices are f.o.b. the softening plant at La Verne):

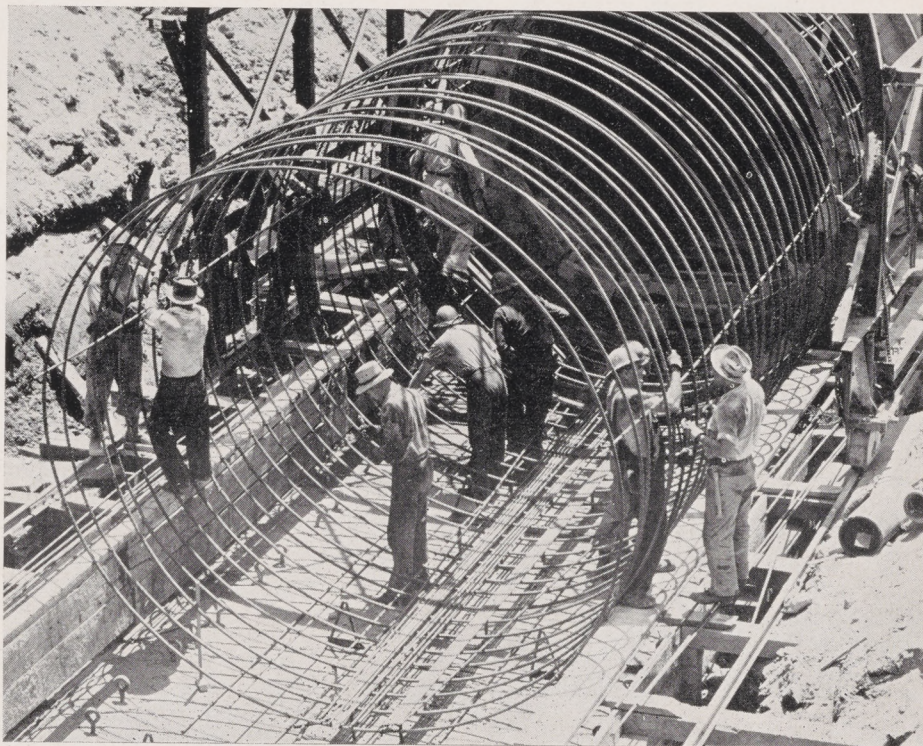
2—72-in. motor operated gate valves, The Chapman Valve Mfg. Company, \$8,048.84.

5—16-in. nonslam check valves, The Chapman Valve Mfg. Company, \$1,723.75.

31—rate of flow controllers and venturi assemblies, Builders Iron Foundry, \$65,907.73.

17—sluice gates, The Chapman Valve Mfg. Company, \$12,280.97.

1—10-ft. x 10-ft. motor operated butterfly valve, Consolidated Steel Corporation, \$3,818.25.



Another view of the Casa Loma siphon construction showing steel crew wiring reinforcing steel core for the siphon barrel.

15—propeller type water meters, R. W. Sparling, \$10,492.43.

5—deep well centrifugal pumps, Victor Equipment Company, \$12,593.57.

6—built-on centrifugal pumps, Buffalo Pumps, Inc., \$2,417.20.

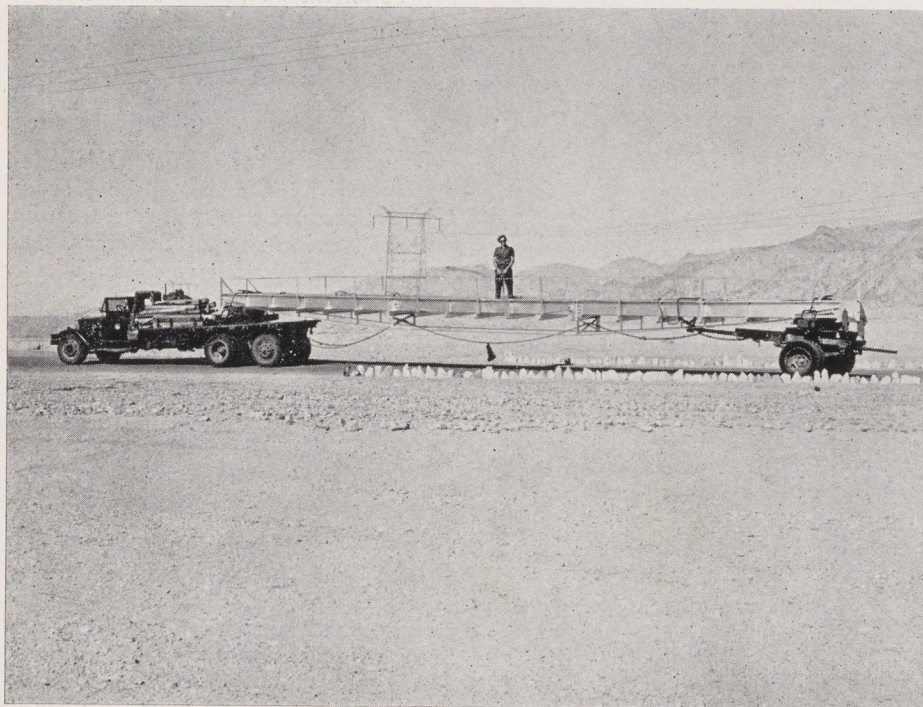
24—sets of operating equipment for hydraulically and electrically operated valves, Simplex Valve and Meter Company, \$15,545.91.

3—78-in. pressure filters, International Filter Company, \$2,675.94.

2—16-in. motor operated valves, The Crane Company, \$2,387.84.

At a previous meeting, the Board of Directors had awarded a contract to the California Portland Cement Company, under Specifications No. 308, for furnishing 24,000 barrels of cement plus or minus 25 per cent, to be used for grouting in the San Jacinto tunnel.

The last issue of the News (June 25, 1939) was in error in stating that the Bureau of Reclamation had awarded a contract to the Shasta Construction Company for the driving of the 13-mile Big Thompson tunnel. The Shasta Construction Company submitted the low bid for the work, but at the time this present issue of the News went to press it was understood that the Bureau of Reclamation has rejected all bids. The Shasta Co. is a consolidation of contractors, and includes the following firms who had contracts on the Colorado River Aqueduct: Utah Construction Co.; Morrison-Knudsen; J. F. Shea Co., Inc.; and The Griffith Company.



This portable steel bridge was used by the Pittsburgh Steel Company to convey materials across canal sections during the erection of fences. The District has now rebuilt it to be used as a permanent bridge across a canal section in the vicinity of Iron Mountain.